CLAIMS

What is claimed is:

1. A medical device comprising:

a substrate having openings, and

a fibrous coating wherein at least one fiber is threaded through the opening in said substrate.

2. The device of claim 1, wherein the fiber comprises at least one nanofiber.

3. The device of claim 1, wherein the fibrous coating is substantially mechanically attached to the substrate.

4. The device of claim 1, wherein the substrate is selected from the group consisting of a stent and a surgical mesh.

5. The device of claim 1, wherein the fibrous coating has at least one polymeric component selected from the group consisting of polycaprolactone, polylactic acid, polyglycolic acid, polydioxanone, polyanhydride, trimethylene carbonate, poly(beta-hydroxybutyrate), poly(g-ethylglutamate), poly(DTH iminocarbonate), poly(bisphenol A iminocarbonate), poly (ortho ester), polycyanoacrylate, polyphosphazene, nylons, polyesters, polyethylene terephthalate, silicon-containing polymers, elastomeric silicone polymers, polypropylene, polyolefins, polyolefin copolymers, elastomeric polyolefins, modified polysaccharides, cellulose, chitin, dextran, modified proteins, fibrin, casein, an adhesive polymer, collagen, and fibrinogen.

6. The device of claim 1, wherein the fibrous coating comprises a nanofibrous sheet.

7. The device of claim 6, wherein the nanofibrous sheet comprises polypropylene.

8. The device of claim 1, wherein the fibrous coating is attached to the substrate by at least one melted nanofiber.

9. The device of claim 1, wherein the fibrous coating is attached to the substrate by at least one nanofiber that has melted and mechanically attached to at least another nanofiber, or the substrate.

10. The device of claim 1, wherein the fibrous coating has been mechanically attached to the substrate by a heating method.

11. The device of claim 10, wherein the heating method is selected from the group consisting of heat sealing, spot heating with a pattern of hot wires, and spot heating with a laser.

12. A process comprising the step of using the device of claim 1 in a medical procedure comprising implantation into a living organism.

13. A method for attaching a fibrous coating to a substrate comprising the step of:

pushing at least a portion of the fibrous coating through at least one hole in the substrate.

14. The method of claim 13 for attaching a fibrous coating to a substrate further comprising the steps of:

adding at least one nanofiber to a fluid; and

passing the fluid through at least one hole in the substrate so that at least a portion of a nanofiber also passes or pushes through the at least one hole in the substrate.

15. The method of claim 13 for attaching a fibrous coating to a substrate, wherein the pushing step further comprises:

using a fluid jet to push at least a portion of the fibrous coating through the at least one hole in the substrate.

16. The method of claim 13, wherein the fibrous coating includes polypropylene fibers.

17. The method of claim 13, wherein the fibrous coating includes polypropylene nanofibers.

18. The method of claim 13, wherein the fibrous coating is formed by electrospinning at least one fiber onto a surface of the substrate.

19. The method of claim 13, wherein the fibrous coating is formed using a nanofibers by gas jet method to manufacture at least one fiber directly onto the substrate.

20. The method of claim 13, wherein fibrous coating is formed using an electrospinnable solution having a temperature sufficient to dissolve the polymer solution.

21. The method of claim 20, wherein the polymer solution comprises polypropylene, polyolefins, or polyolefin copolymers.

22. A method for attaching a fibrous coating to a substrate comprising the steps:

providing a substrate;

coating a first side of the substrate with a fibrous coating; and

forcing at least one fiber through an opening in the substrate.

23. The method of claim 22, wherein the step of forcing at least one fiber through an opening in a substrate is performed by:

adding at least one fiber to a fluid to thereby form a fiber-fluid solution; and

passing the fiber-fluid solution through at least one hole in an device wall so that the fiber is threaded by the fluid into the at least one hole in the device wall.

24. The method of claim 22, wherein the device is a stent or substrate and the substrate is a stent wall or a surgical-mesh wall.

25. The method of claim 22 for attaching a fibrous coating to a substrate further comprising the step:

pulling at least a portion of the fibrous coating through at least one hole in the substrate.

26. The method of claim 22, wherein the step of pulling at least a portion of the fibrous coating through the at least one hole in the substrate is performed by pulling a substantially needle-like object through at least one hole in the substrate, wherein a portion of the fibrous coating is pulled through the at least one hole by the needle-like object.

27. The method of claim 22, wherein the step of pulling at least a portion of the fibrous coating through the at least one hole in the substrate is achieved by performing the additional steps:

inserting a portion of at least one substantially needle-like object through the at least one hole;

attaching at least one nanofiber to the substantially needle-like object; and

withdrawing the substantially needle-like object from the at least one hole so that the at least one nanofiber is pulled through the at least one hole.

28. The method of claim 22 for attaching a fibrous coating to a substrate further comprising the steps:

applying a positively-charged fibrous coating to a first side of the substrate; and

applying a negatively-charged fibrous coating to a second side of the substrate.

29. The method of claim 22, further including

coating a second side of the substrate with at least a second fiber;

wherein the fibrous coating or the at least a second fiber is contact adhesive, and

wherein the fibrous coating and the at least a second fiber contact each other so that at least a portion of the fibrous coating and the at least a second fiber forms an adherent joint.

30. The method of claim 22 for attaching a fibrous coating to a substrate further comprising the step:

heat treating a fibrous coating, wherein the heat treatment causes at least one nanofiber to melt and form an adherent joint with at least, another nanofiber, or the substrate.

31. The method of claim 30, wherein the heat treating step further comprises using a laser, a heating element, or a combination thereof.

32. A means for mechanically attaching a fibrous coating to a substrate.

33. The means of claim 32, wherein the fibrous coating comprises at least one nanofiber

34. The means of claim 33, wherein the fibrous coating comprises a free-standing fibrous polymer sheet